Mt. San Jacinto College
Integrated Course Outline of Record

Form B

Submitted by: Patrick Smith **Date:** 06/25/2020

Department	Subject	Course Number	Title
Geology	Geology GEOL	107	Scenic Adventure Field Trips in Geology

Units/Hours

Each lecture unit requires 1 hour per week of class time, and 2 hours per week of study outside of class.
Each laboratory unit requires 3 hours per week of class time.
Each activity unit requires 2 hours per week of class time and 1 hour per week of study outside of class.

Lecture Units	Lab Units	Total Units
1.00	0.50	1.50
Lecture Contact Hours	**Lab Contact Hours**	**Total Contact Hours**
16.00 - 18.00	24.00 - 27.00	40.00 - 45.00
Lecture Homework Hours	**Lab Homework Hours**	
32.00 - 36.00	0	

Stand Alone:

Program Applicable

AA/AS Degree General Ed Breadth Area(s):

A NATURAL AND PHYSICAL SCIENCES

General Education Justification:

This course meets Option A-Area A for 1.5 units of Physical Science lecture and transfer. It examines complex issues in the field such as plate tectonics in relationship to normal faulting and basement extension, and discovers the connections and correlations among ideas in Earth sciences and complex field relationships (GELO1). It uses analysis to explain issues in quantitative terms using college-level mathematical concepts (equivalent to math 96) and methods including rates and motions on tectonic plates, fault rate calculations, and recurrence intervals (GELO4). Students are required to apply their theoretical knowledge and skills to real-world field geology exposures and situations (GELO5). Students will be exposed to the use of topographic and geologic maps and learn current geologic mapping techniques (GEL06). This course is needed to encourage an understanding of the relationship between the sciences of changing climate (melting glaciers, ocean acidification in the Bahamas, etc.) and environmental hazards, and human activities.

Maximum Enrollment: 24

Maximum Enrollment

Justification:

Justification: Currently MSJC provides a bus for this Geology 107 coarse which limits enrolment possibilities for enrolment in this class.

Grading Method: Letter Grade or P/NP

TOP code: 1914.00

Can be Taken 1 **time(s) for credit** (max 4)

- Visual or Performing Arts course that is required to meet major requirements for UC/CSU
- Intercollegiate athletics course
- Academic/vocational competition course

Catalog Description:

(Please do not refer to transferability or degree, certificate, or employment concentration applicability. Please only describe the course).
(**75 words** or less in gray box below).

This course visit various locations including Death Valley, the Grand Canyon, and Owens Valley. It provides field experiences, gives greater insight into tectonic Earth shaping forces, and help students discover the fantastic mineral and rock wealth created by alternating ice age climates. A three hour prep class meeting and overnight camping will be required. This is a 1.5 unit course, with 1 unit being Lecture Credit and 0.5 units being Lab Credit.

Schedule Description:

(Please do not refer to transferability or degree, certificate, or employment concentration applicability. Please only describe the course).
(**25 words** or less in gray box below).

This course explores earthquakes, faults rocks and minerals, and the legacy of ice age climates in this geologic field adventure.

Need for the course:

This course is a lower division option for students transferring into four year majors such as geology, geobiology, paleontology, seismology, and geophysics. It serves to fill Area B1 of the General Education Requirements for California State Universities. It also provides an additional natural science course option for both the science and non-science student and is needed to provide field experience to students taking Physical, Environmental, or Historical Geology.

Prerequisite(s):

Prerequisites go through a separate approval process. See Forms E1-E6 for details.
(For further clarification, contact the Prerequisite Subcommittee)

-none-

Corequisite(s):

Corequisites go through a separate approval process. See Forms E1-E6 for details.

-none-

Recommend Preparation:

Recommended Preparation goes through a separate approval process. See Forms E1-E6 for details.

-none-

Other Enrollment Criteria:

-none-

Learning Objectives:

(please number each objective and express in behavioral terms)

Upon the completion of the course the student will be able to do the following:

1. Categorize the basic components and terms of the plate tectonic theory including risk to humans
2. Identify and describe basic minerals in the field
3. Identify and describe basic rocks and textural features in the field
4. Predict the extent and type of economic ore deposits in various field locations
5. Compare and contrast depositional environments and their operating systems including the mass wastage, aeolian, fluvial, and glacial systems
6. Evaluate the difference between absolute and relative age, including the field identification and interpretation of unconformable and crosscutting rock relationships
7. Analyze and identify characteristics of basic fossil hand sample specimens and relate them to their geologic time period
8. Classify and analyze characteristics of geologic formations and relate them to their geologic time period
9. Prepare and appraise topographic and geologic maps with regard to the various elements depicted

Course Content:

(please number the outline of main topics and subtopics)

1. Plate Tectonics
    1. Basic features of plate tectonics and rate calculations
    2. Rhombichasm subsidence
    3. Earthquake hazards and human risks and recurrence intervals
2. Rocks and Minerals
    1. Mineral properties, identification, and uses
    2. Igneous rocks and volcanic hazards (phreatic explosions)
    3. Sedimentary rocks, processes, and environments
    4. Examination of economic ore's in death Valley
3. Depositional Environments and Systems
    1. processes of mass wasting in alluvial fans (debris floods) and alluvial cones (debris flows)
    2. Dry desert landforms and aeolian environments
    3. Stream processes and flood hazards
    4. Glacial processes, landforms, and indicators of climate change
4. Historical Geology
    1. Geologic formations and thickness calculations
    2. Stratigraphic superposition and the dating of rocks, fossils, and geologic events
    3. Unconformities
    4. Crosscutting relationships
5. Topographic and geologic maps, and compass bearing calculations

Lab Content:

(please number the outline of main topics and subtopics)

1. plate tectonics
    1. measuring rates of plate motion
2. minerals
    1. introduction to hand tools
    2. introduction to lab procedures
    3. mineral properties
    4. identification of hand samples
3. igneous rocks/processes

1. classification
2. composition
3. texture and formation
4. identification of and samples

4. sedimentary rocks/procedures
    1. classification
    2. composition
    3. texture and angularity
    4. identification of hand samples
5. metamorphic rocks/procedures
    1. classification
    2. composition
    3. foliation and mineral assemblage
    4. identification of hand samples
6. topographic maps
    1. map symbols
    2. analysis of mapped geologic features
7. geologic structures
    1. geologic units
    2. deformation
    3. outcrops
    4. strike and dip
8. weathering, streams, and mass wasting
    1. stream topography
    2. stream erosion
    3. mass wasting
9. groundwater hydrology
    1. caves and karst topography
10. desert deposits
    1. topography of desert features
    2. eolian processes
    3. desertification
    4. dune identification and classification
11. geologic time/dating
    1. relative timescale
    2. absolute timescale
12. seismology
    1. P and S waves
    2. recurrence intervals
    3. fault motions
    4. earthquake prediction

Methods of Instruction:

Methods of instruction may include, but are not limited to the following:

- **Method:** Lecture
  Integration: Pre field lecture (introduction, assignments, and overview) Overview will present the general physical, historical, and economic geology of the region to be visited
- **Method:** Pre-field homework
  Integration: Pre-field homework Students will be assigned to read information from the text and handouts.
- **Method:** Field Experience
  Integration: In-field rock and mineral hand sample identification, fossil identification, and topographic and geologic map use.
- **Method:** In-field lecture

Integration: In-field lecture on eolian and mass wastage processes and geochronological relationships
- **Method:** Research paper
  Integration: A short research paper will require students to succinctly relate the geo-historical development of the region visited to the geologic rock and mineral formations, and to the processes that have created the eolian and mass wastage landforms.

Methods of Evaluation:

A student's grade shall be determined by the instructor using multiple measures of performance related to the course objectives. Methods of evaluation may include but are not limited to the following:

- **Method:** Homework
  Integration: Pre field homework essay will be used to evaluate the studentâ€™s basic understanding of the plate tectonics, rocks and minerals, depositional environments, and historical geology of the Death Valley area.
- **Method:** Papers
  Integration: A final written report will evaluate the student's ability to relate the physical and historical geology to its rocks and landforms.
- **Method:** Class Participation
  Integration: Participants will be required to discuss depositional environments in relationship to the formations they create, sketch trace fossils and structures within the rocks that indicate depositional systems, and identify hand sample of minerals, rocks, and economic ores.

Examples of Assignments:

Students will be expected to understand and critique college level texts or the equivalent. Reading and writing, as well as out of class assignments are required. These assignments may include but are not limited to the following:

1. This assignment is a collection of short definitions and will be due upon departing on the field trip. The assignment should contain short definitions for all 25 words listed on the definition page. Brevity is encouraged; the length of the answer will have no bearing on the grade achieved. Students should take the time to analyze the words using critical thinking methodology, and construct definitions that are brief, intuitive summaries of the underlying issues, points, or principles involved. Information sources for this assignment may include the field trip textbooks, a Physical Geology lab book that I have put on reserve in the library, geologic web sites, or any other geologic text. References are not required. (Example words: igneous rock, fanglomerate, pluvial lake, etc.)
2. Assignment number two is a two-page essay and will be due by Monday one week after we return from the field trip. The essay should respond to the two statements below. All of the information can be found in the class texts. Your paper should have two centered, bolded, section titles, including the **Title** of the paper (suggestion: An Overview of the Geologic Features and Geologic History of Death Valley, California) and a section at the end of the paper entitled **References**. Scientific reference notation is required (though only one or two references are necessary).
   No. 1: On page 1, described the significant geologic features visited during this field trip, and use these features as examples of the geologic words and phrases that you have defined in the definitions assignment.
   No. 2: On page 2, summarize the geologic history of Death Valley beginning with the basement complex rocks and ending with the deposition of Furnace Creek Basin sediments.

Textbooks:

- Robert P. Sharp, Allen F. Glazner (1997). *Geology Underfoot in Death Valley and Owens Valley* Mountain Press Publishing Company. ISBN: 9780878423620
- Miller,M. G., and Wright, L., A. (2006). *Geology of Death Valley National Park* Kendall/Hunt. ISBN: 0757509509
- Ronald C. Blakey, Wayne D. Ranney (2018). *Ancient Landscapes of Western North America: A Geologic History with Paleogeographic Maps* springer nature. ISBN: -13: 978-3319596341
- Lonely Planet (2019). *Lonely Planet Grand Canyon National Park Planning Map* Lonely Planet. ISBN: 1788685946

Other Resources:

Minimum Qualification

- Earth Science (Masters Required)